

## PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) RAMP FOR LONGWALL MINING CONVEYOR

(71) We, MAVOR & COULSON LIMITED, a British Company, of 47 Broad Street, Bridgeton, Glasgow, SE Scotland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to longwall mining conveyor section ramps, and to a method of longwall mining using such ramps. The mineral will now be assumed to be coal.

It is explained that in longwall mining conveyors the frame or base is made in sections connected end-to-end so that each section can be advanced against the newly cut face of the seam as the coal cutting machine, which is mounted on the base, passes that section.

Some of the coal cut by the machine does not fall on the conveyor, but falls on the floor of the seam between the face and the face side of the conveyor. Each section of the conveyor at its face side has a ramp to facilitate the passage of cut coal from the floor on to the conveyor as the sections are pushed towards the face.

The coal does not move easily up the ramps, but tends to compress solidly, so that the conveyor sections cannot be pushed against the newly cut face, or the conveyor rides over and lies on the coal on the floor, and the setting of the conveyor is upset.

In order to facilitate the passage of coal up the ramps, it is known to provide reciprocatory ploughs on the ramps. This involves the provision of ploughs, haulage chains, drive sprockets and motors and, in use, considerable power is consumed.

An object of the present invention is to provide a ramp incorporating simple and inexpensive means for facilitating movement of coal up the ramp, and which requires little power in operation.

According to the present invention we provide a longwall mining conveyor section ramp comprising a ramp plate, a mounting adapted for mounting on a mining conveyor section and carrying said plate so that the latter may vibrate relative thereto, and

vibratory means adapted to vibrate the ramp plate when in use, so as to facilitate movement of mineral up the ramp.

Further, according to the present invention we provide a ramp as aforesaid in combination with a conveyor for use in longwall mining.

Still further, according to the present invention we provide in a method of longwall mining in which a section of the longwall mining conveyor has a ramp; the step of vibrating the face of the ramp as said section is being pushed in towards a newly cut face of a seam so as to facilitate the passage of cut coal from the floor up the ramp.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a front elevation of a ramp according to the invention;

Figs. 2, 3 and 4 are respectively sections on the lines II-II, III-III and IV-IV of Fig. 1.

Referring to the drawings, a ramp 1 for a conveyor for use in the longwall mining of coal consists generally of an inclined ramp plate 2 and a mounting 3 carrying the plate 2, the mounting 3 being bolted to the side rail or line pan 4 of a conveyor.

The mounting 3 is in the general form of an angle iron, of which the upright wall 5 abuts the rail 4, and the horizontal wall 6 lies on the floor and has a toe 6A at its outer end which presents a cleaning and loading edge.

The plate 2 extends between the outer ends of the walls 5, 6 and nests freely in recesses 7 in said outer ends. The plate 2 rests on resilient seals 8 in the recesses 7, and has longitudinally spaced bosses 2A on its underside which abut resilient blocks 9 which in turn abut spaced webs 10 extending between the walls 5, 6. The plate 2 is attached to the webs 10 by set screws 11 passing through holes in the bosses 2A and the blocks 9. Each set screw 11 has a shoulder 11A so that the degree of compression on the blocks 9 may be limited.

Midway of the length of the plate 2, vibratory means in the form of a pneumatic vibrator 12 is provided on a bracket 2B on

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the plate 2 for vibrating the plate 2 relative to the mounting 3, when that conveyor section is being pushed towards a newly cut face. The vibrator 12 may consist of a housing having a circular chamber containing a ball and connected to a supply of compressed air. When compressed air is introduced into the chamber the ball rotates rapidly around the chamber and produces an out-of-balance force on the housing thus causing the latter, and consequently the plate 2, to vibrate. The compressed air line for the pneumatic vibrators 12 is housed below the plates 2 and extends along the full length of the conveyor. Preferably, each ramp plate 2 is vibrated only when that section to which it is attached is being moved towards the newly cut face, and this may be effected by the use of a trip valve operated by the cutting machine as it passes that section. The ramp plates may alternatively be vibrated in selected groups.

In use, when a conveyor section is pushed towards a newly cut face, the ramp plate 2 is vibrated, and cut coal which has accumulated between the face and the ramp moves easily up the ramp.

The pneumatic vibrator 12 may be replaced by a pneumatic hammer type vibrator, or by a hydraulic, mechanical or electrical vibrator, and a plurality of vibrators may be provided on each ramp plate 2.

The seals 8 and the bosses 9 may be made of rubber or of any other suitable resilient material.

The wall 5 of the mounting 3 may be attached to the rail 4 by bolts 13 and nuts 14, the bolts 13 passing through slots 15 in lugs 16 on the rail 4 and through holes in the wall 5. The lugs 16 lie in a channel 17 in the outer side face of the rail 4.

A suitable frequency of vibration for the ramp plates is in the region 16,000 cycles per minute.

In the use of a conveyor with ramps as described above, cut coal on the floor of a seam moves much more easily up the ramps, and the tendency for the coal to compact is overcome or greatly reduced.

#### WHAT WE CLAIM IS:—

1. A longwall mining conveyor section ramp comprising a ramp plate, a mounting adapted for mounting on a mining conveyor section and carrying said plate so that the latter may vibrate relative thereto, and vibratory means adapted to vibrate the ramp plate, when in use, so as to facilitate movement of mineral up the ramp.

2. A ramp according to claim 1, in which the mounting is in the form of an angle member having, in use, an upstanding wall

and a substantially horizontal wall, and in which said ramp plate extends between outer end portions of said walls.

3. A ramp according to claim 2, in which the ramp plate is resiliently located in recesses in said outer end portions of the walls.

4. A ramp according to claim 2 or 3, in which the ramp plate is resiliently secured to the angle member by at least one setscrew passing through a boss on the plate and engaging in a web on the mounting, and in which a resilient block is sandwiched between said boss and said web.

5. A ramp according to any preceding claim, in which said vibratory means is a vibrator comprising a housing mounted on the plate, said housing having a circular chamber containing a ball and adapted for connection to a supply of compressed air, the arrangement being such that, when said air is introduced into the chamber, the ball rotates rapidly around the chamber and produces an out-of-balance force on the housing and causes the latter and the plate to vibrate.

6. A ramp according to any one of claims 1 to 4 in which said vibratory means is a vibrator of the pneumatic hammer type 7. A ramp according to any preceding claim, in which the vibratory means is adapted to vibrate the ramp plate at a frequency in the region of 16,000 cycles per minute.

8. A ramp according to any preceding claim in combination with longwall mining conveyor.

9. The combination according to claim 8, in which the mounting is connected to the line pan of the conveyor by at least one nut and bolt assembly, of which the bolt passes through a hole in the mounting and a slot in a lug on the line pan.

10. The combination according to claim 9, in which said lug is in a channel in the outer side face of the line pan.

11. In a method of longwall mining in which a section of the longwall mining conveyor has a ramp; the step of vibrating the face of the ramp as said section is being pushed in towards a newly cut face of a seam so as to facilitate the passage of cut mineral from the floor up the ramp.

12. A ramp for a conveyor substantially as hereinbefore described with reference to the accompanying drawings.

13. The method of longwall mining substantially as hereinbefore described.

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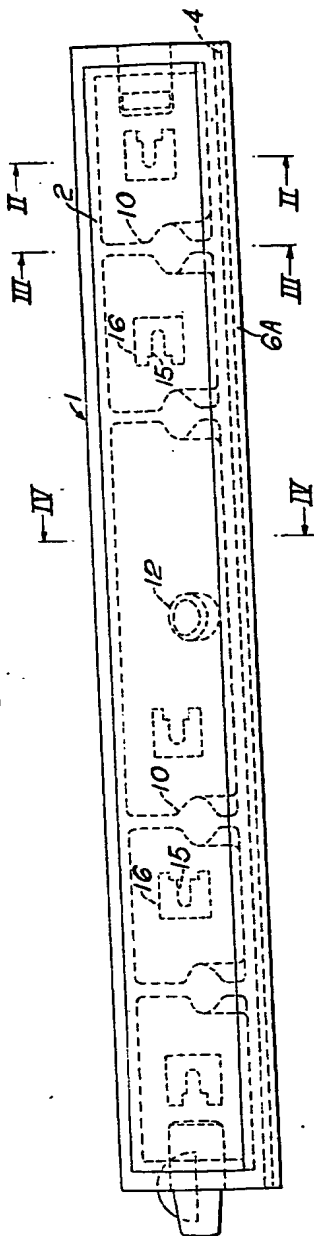
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COMPLETE SPECIFICATION

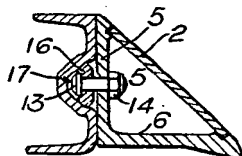
2 SHEETS

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Sheet 1

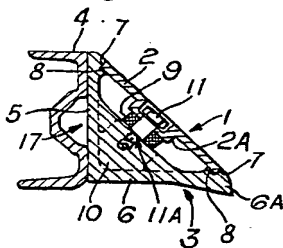
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



*Fig. 4.*

